



Research Journal of Social Sciences

ISSN: 1815-9125 EISSN: 2309-9631

JOURNAL home page: <http://www.aensiweb.com/RJSS>

2015 Special; 8(12): pages 1-6

Published Online 13 November 2015.

Research Article

Development and Evaluation of Strategic Intervention Material in Science V

¹Airene S. Marimla and ²Dr. Olivia G. Dimalanta

¹Northville 15 Integrated School, DepEd Angeles City, Pampanga, Philippines

²Institute of Teacher Education, Pampanga State Agricultural University, Pampanga, Philippines

Received 3 October 2015; Accepted 10 October 2015

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ABSTRACT

The study was conducted to determine the usefulness of the Strategic Intervention Material in Science V to the performance of the pupils. Specifically, the study dealt to identify the least learned topics in Science V in the third quarter; to describe the scores of the pupils in the pretest; to know the scores of the pupils in the posttest; to prove the highly significant difference between the scores of the pupils in the pretest and posttest; to know how the Strategic Intervention Material in Science V developed by the researcher was evaluated by the experts on SIM in terms of Content/Objectives, Subject Matter, Presentation and Organization and Usefulness. The quasi-experimental method was used in the study, standardized test, strategic intervention material and an evaluation form were the primary instruments used in gathering data. Pretest was first administered to identify the least learned topics in Science in order to develop a strategic intervention in Science V which consisted of two least learned topics. Electricity and Simple Machines were the two least learned topics; teacher respondents strongly agreed on the content/objectives, subject matter, presentation and organization and usefulness of the Strategic Intervention Material; the performance of the pupils on the Strategic Intervention Material based on their scores was described satisfactory and very satisfactory. There was an improvement in the posttest scores of the pupils. It revealed that there was highly significant difference between the pretest and posttest scores of the pupils. It was concluded that Strategic Intervention Material is useful in order to reduce the least learned topics and at the same time to improve the performance of the pupils.

Keywords: Development; Evaluation; Strategic Intervention Material; Science.

INTRODUCTION

Science has led us to finding out things that give us what we have today. In fact without Science, we would not have electricity which would mean no mobiles, internet and face book. There would not have fridges to keep food fresh, television and other appliances and gadgets we use at home to entertain or even cars to travel in.

Today, science influences so many different things. Science has influenced the medical industry that today reduces thousands of deaths every day. But is science only about new inventions, new technology and new medicines?

Science is not merely focusing on inventions, medicines and advancement of technology. It also pertaining to acquisition of new and factual knowledge, information, skills to feed the mind and defeat curiosity of today's changing world.

Science is important because it has helped form the world where people live in today. It is interesting to know that many people are becoming highly engaged to scientific studies and related matters. Would you not want to imagine a world where people are into scientific literacy? That is, they are fully aware with scientific progress in the field of medicine, industries and commerce, environmental, transportation and communication. This would

greatly happen if people would develop interest in Science as early as their elementary years. Science teachers now play a vital role on how to make Science class more interesting and more appealing to learn to. What could be an ideal Science class?

Traditionally, teachers are encouraged to believe that learning environment must be orderly and quiet. For some principals, a quiet classroom means effective teaching. With the growing movement toward cooperative learning, however, more teachers are using activities in which students take an active role. Sharing ideas and information with various activities occurring at the same time can make for noisy classroom. But it would be a mistake to conclude that in such classroom pupils are not learning.

With the fast changing need of the 21st century pupils, teachers must meet even those whom are tagged “left-behind pupils”. This is the reason why the use of Strategic Intervention Material put into consideration.

One of the identified problems on education is the low performance of the National Achievement Test (NAT). In spite of different curricula implemented and proposed by Department of Education, this has been the battle point of teachers. Does the changing of educational curriculum really affects pupils’ performance? This can be answered by a simple Yes or No. But to have a deeper and meaningful answer is to consider pupil factors like their level of motivation towards learning and the like.

In response with the identified problem, teachers can use variety of teaching methodologies and instructional materials for effective learning. That is why, the researcher decided to develop and produce Strategic Intervention Material to test its effectiveness designed for Northville 15 Integrated School, Science V pupils.

Importance of Strategic Intervention Material:

The strategic intervention materials are effective in mastering the competency based skills in chemistry based on the mean gain score in the posttests of the experimental and control groups. Intervention material contributed to better learning of the concepts among students. Posttests are maintenance test indicated that students who were taught with material employing the causal style of discourse had significantly better retention of facts and concepts and were superior in applying this knowledge in problem solving exercises.

According to the study of Dy, the achievement of the students in the experimental group who were exposed to the SIM is higher and better compared to the students taught in the traditional approach both in the first and second grading periods. The 75 percent proficiency/performance level required in any subject area has been attained/reached in the experimental group. There is a significant difference

in the achievement of the students in the control group and experimental group. This suggests that the Strategic Intervention Materials (SIM) be adopted as Instructional Materials for teaching Science to facilitate and improve performance. Furthermore, future researchers could work and prepare the same materials on other learning areas.

In the Transformation Learning Theory of Wink, it is important for Science educators to recognize the fact that a student who cannot solve certain problems is one who lacks particular knowledge. This is further supported by the Novak’s Theory of Constructivism whereby Bretz stressed that “a meaningful learning underlies the constructive integration of thinking, feeling, and acting, leading to human empowerment for commitment and responsibility”. Meaningful learning will only occur when education provides experience that require students to connect knowledge to across the three domains either cognitive, affective or psychomotor domain.

The Science teacher must design a learning experience which will attend to three domains. Science students must have an understanding of and a commitment to the requisite conditions for meaningful learning. Novak’s theory gives “irreducible common place”- the evaluation. Evaluation is obviously important in measuring learning outcomes. Test will assess students’ cognitive, practical, and social skills. Therefore, the results in the achievement test such as the National Achievement Test clearly show whether the students have gained and mastered and skills in a particular subject.

2. Objectives:

1. What are the least learned topics in Science?
2. How may the evaluation of experts on the Strategic Intervention Material in Science V be described in terms of:
 - a. content/objectives
 - b. subject matter
 - c. presentation and organization, and
 - d. usefulness?
3. How may the pupils performance on the strategic intervention material be described?
4. Is there a significant difference between the pretest and posttest scores of the pupils?

3. Hypothesis:

1. There is no significant difference between the pretest and posttest scores of the pupils.

MATERIALS AND METHODS

4.1 Respondents

The respondents of the study were the Science teachers expert by using SIM of Francisco G. Nepomuceno Memorial high School, Angeles City SY 2014-2015.

4.2 Instruments:

Standardized test, Strategic Intervention Material and an Evaluation form were used in the study. A standardized test was used in the study. It was a 50-item multiple type of test given to the pupils from the division office. Topics included in the test were about Electricity, Simple Machines and Rocks and its Characteristics.

A Strategic Intervention Material also used in the study and it was developed based on the identified least learned topics on the Item Analysis, it shows the number of correct on each item, topic and their rank.

Strategic Intervention Material composed of six parts: Title Card; Guide Card; Activity Card; Assessment Card; Enrichment Card; and Reference Card. This was validated by the experts in using Strategic Intervention Material.

Evaluation form composed of four parts: objectives; subject matter; presentation and organization and usefulness which was used by the experts and served as bases to evaluate the Strategic Intervention Material developed by the researcher.

4.3 Data Collection:

The researcher followed series of steps to gather the necessary data.

Permission from principal of the chosen school was sought through a formal letter. The approval and cooperation of the teachers were also requested. Upon approval of the request, the test was administered by the researcher to the three hundred twenty six (326) pupils. After the pretest, the pupils' scores were tabulated to select pupils who got a

failing score and through item analysis, researcher identified the least learned topics.

After the least learned topics were identified, the researcher developed a Strategic Intervention Material in Science V. This material was evaluated by the experts of Francisco G. Nepomuceno Memorial High School

Comments and suggestions of the experts were followed and incorporated by the researcher. This material was reproduced and used by the pupils.

The intervention program started two weeks after the administering of pretest for the preparation of the instrument. The pupils were divided into two groups. They were requested to attend remedial classes at 3:00-4:00 P.M. for the first group and 4:00-5:00 P.M. for the second group at the same time worked with the Strategic Intervention Material Materials prepared by the researcher. At the end of remedial classes posttest was administered. The results of the posttest were tabulated and compared with the results of the pretest.

5. Results:

5.1 Findings:

The findings revealed in Table 1 are the least and most learned topics in Science V. Table 2 shows the evaluation of experts on the strategic intervention material in Science V in terms of content, subject matter, presentation and organization and usefulness. Table 3 presents the pupils' performance on the strategic intervention material in Science V. Table 4 presents the significant difference between the pretest and posttest scores of the pupils.

Table 1: Least and most learned topics in Science V.

Rank	Item no.	Total number of correct	Ten Least Learned Topics	Item no.	Total number of correct	Ten Most Learned Topics
1	30	141	Energy/Electricity	26	258	Simple Machines
2	19	142	Energy/Electricity	20	257	Simple Machines
3	37	143	Energy/Electricity	23	255	Simple Machines
4	21	147	Simple Machines	48	250	Rocks
5	32	150	Energy/Electricity	15	235	Simple Machines
6	36	152	Energy/Electricity	27	235	Simple Machines
7	24	155	Simple Machines	31	233	Rocks
8	7	158	Energy/Electricity	18	230	Simple Machines
9	45	160	Energy/Electricity	39	225	Rocks
10	9	162	Energy/Electricity	50	222	Rocks

In table 1, the result shows that among the topics included in the standardized test, from the least learned topics, item number 30 about Electricity was ranked 1 with 141 numbers of correct; item number 19 about Simple Machines was ranked 2 with 142 numbers of correct; item 37 about Simple Machines was ranked 3 with 143 numbers of correct; item 21 about Simple Machines was ranked 4 with 147 numbers of correct; item number 32 about Electricity was ranked 5 with 150 numbers of correct; item number 36 about Electricity was ranked 6 with 152 numbers of correct; item number 24

about Simple Machines was ranked 7 with 155 numbers of correct; item 7 about Electricity was ranked 8 with 158 numbers of correct; item 45 about Electricity was ranked 9 with 160 numbers of correct; and item 9 about Electricity was ranked 10 with 162 numbers of correct

However, it also shows in the table that from the most learned topics, item number 26 about Simple Machines was ranked 1 with 258 numbers of correct; item number 20 about Simple Machines was ranked 2 with 257 numbers of correct; item 23 about Simple Machines was ranked 3 with 255 numbers of correct;

item 48 about Rocks was ranked 4 with 250 numbers of correct; item number 15 about Simple Machines was ranked 5 with 235 numbers of correct; item number 27 about Simple Machines was ranked 6 with 235 numbers of correct; item number 31 about Rocks was ranked 7 with 233 numbers of correct; item 18 about Simple Machines was ranked 8 with 230 numbers of correct; item 39 about Rocks was

ranked 9 with 225 numbers of correct; and item 50 about Rocks was ranked 10 with 222 numbers of correct.

The results showed that the respondents had difficulties on these topics, and therefore needed intervention from the teachers such as developing a Strategic Intervention Material for more effective teaching-learning process.

Table 2: Evaluation of experts on the strategic intervention material in Science V.

Statement	Mean	Interpretation
OBJECTIVES		
Based on the budget of work of the subject in Science V	4.00	Strongly Agree
Specific and attainable	4.00	Strongly Agree
Relevant to the purpose of the topics	4.00	Strongly Agree
Measures the three domains: cognitive, affective and psychomotor	3.70	Strongly Agree
Grand Mean	3.90	Strongly Agree
SUBJECT MATTER		
The topics have met the objectives of the Strategic Intervention Material	3.90	Strongly Agree
The topic is clear and suitable to the level of the learner	3.90	Strongly Agree
The lesson in the Strategic Intervention Material is easy to understand	3.90	Strongly Agree
The topic measures the three domains: cognitive, affective and psychomotor	3.70	Strongly Agree
Grand Mean	3.85	Strongly Agree
PRESENTATION AND ORGANIZATION		
The topic is presented logically and sequentially	3.90	Strongly Agree
The direction in every activity is clearly stated.	4.00	Strongly Agree
The concepts, examples and exercises are motivating	3.90	Strongly Agree
The illustrations and figures are presented to have a better understanding of the topics.	3.70	Strongly Agree
Grand Mean	3.88	Strongly Agree
USEFULNESS		
The Strategic Intervention Material helps to develop the critical thinking of the learners.	3.90	Strongly Agree
It makes the concept and ideas in Science V lighter for better understanding and retention.	3.90	Strongly Agree
It relieves the difficulties of the learners in learning Science.	3.90	Strongly Agree
It increases enthusiasm and boost the interest of the learners to learn in Science.	3.90	Strongly Agree
Grand Mean	3.90	Strongly Agree

Legend: 3.5-4.0 Strongly Agree
 2.5-3.0 Agree
 1.5-2.0 Disagree
 0.5-1.0 Strongly Disagree

Table 2 describes the evaluation of experts on the Strategic Intervention Material in terms of content/objectives, subject matter, presentation and organization and usefulness

Based on the table, it reveals that the content/objectives of the Strategic Intervention Material obtained a grand mean of 3.9 which was interpreted as “strongly agree.” Also, it showed in the table that the Strategic Intervention Material as

regards to Subject Matter obtained a grand mean of 3.85 which was interpreted as “strongly agree.”

In addition, the presentation and organization of the Strategic Intervention Material obtained a grand mean of 3.88 which was also interpreted as “strongly agree.”

Moreover, the respondents “strongly agree” to the usefulness of Strategic Intervention Material which obtained a grand mean of 3.9.

Table 3: The pupils performance on the strategic intervention material in Science.

scores	pretest		posttest		Interpretation
	f	%	f	%	
46-50	0	0	0	0	Excellent
36-45	0	0	89	74.00	Very Satisfactory
25-35	0	0	31	26.00	Satisfactory
11-24	115	95.83	0	0	Fair
0-10	5	4.17	0	0	Poor
TOTAL	120	100.00	120	100.00	

In table 3, it illustrates the performance of the respondents on the Strategic Intervention Material in Science V.

Among the one hundred twenty (120) pupils who took the pretest, 5 or 4.17% got scores from 0-

10 which was described a poor rating; 115 or 95.83% got scores from 11-24 which was described a fair rating, and nobody got scores from 25-35, 36-45 and 46-50 respectively.

Also, as regards to their posttest, 89 or 74% got from scores 36-45 which described a very satisfactory rating, 31 or 26% from scores 25-35 which was described a satisfactory rating; and

nobody got scores from 46-50, 11-24, and 0-10 respectively.

This implies that there was an improvement in the posttest performance of the pupils by using Strategic Intervention Material in Science V.

Table 4: Significant difference between the pretest and posttest scores of the pupils.

variable	N	t-test	p-value	Interpretation
pretest vs posttest	120	48.3	0.000	highly significant

Legend: If p value is < 0.05* significant
< 0.01** highly significant >0.05 not significant

Table 4 shows the difference between the pretest and posttest scores of the pupils by using Strategic Intervention Material in Science V

The computed p-value of 0.000 was less than 0.01, It reveals that there was a highly significant difference between the pretest and posttest scores of the pupils

This implies that there was an improvement in the posttest performance of the pupils using Strategic Intervention Material than their performance in the pretest without using Strategic Intervention Material.

5.2 Discussion and Conclusion:

The pupils have difficulties on the topics Electricity and Simple Machines and therefore need an intervention from the teachers such as developing a Strategic Intervention Material for more effective teaching-learning process.

The Strategic Intervention Material in Science V developed by the researcher and used by the pupils is valid and can also be used by other Science teachers. Teachers can also develop Strategic intervention Material not only in Science but also to the other subject as well.

There is an improvement in the posttest performance of the pupils by using Strategic Intervention Material in Science V.

There is an improvement in the posttest performance of the pupils using Strategic Intervention Material than their performance in the pretest without using Strategic Intervention Material.

Dy (2007) also revealed in her findings that there is a significant difference in the achievement of the students in the control group and experimental group.

This suggests that the Strategic Intervention Materials (SIM) be adopted as Instructional Materials for teaching Science to facilitate and improve performance. Furthermore, future researchers could work and prepare the same materials on other learning areas.

5.3 Recommendations:

From the previous mentioned findings, the following recommendations were proposed.

The pupils have difficulties on the topics Electricity and Simple Machines and therefore need an intervention from the teachers such as developing

a Strategic Intervention Material for more effective teaching-learning process.

The Strategic Intervention Material in Science V developed by the researcher and used by the pupils is valid and can also be used by other Science teachers.

Teachers can also develop Strategic Intervention Material not only in Science but also to the other subject as well.

There is an improvement in the posttest performance of the pupils by using Strategic Intervention Material in Science V.

There is an improvement in the posttest performance of the pupils using Strategic Intervention Material than their performance in the pretest without using Strategic Intervention Material.

Authors' Contribution:

Ms. Airene S. Marimla authored the current study and Dr. Olivia G. Dimalanta, thesis adviser, guided and assisted the main author in the conceptualization and editing of the manuscript.

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